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EXAMINER

KUHAR, ANTHONY J

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 06/25/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/058,541

Applicant(s)

HOLSTE ET AL.

Examiner

Anthony J Kuhar

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: On page 2, line 16, "sulfite" appears to be intended as "sulfide" because the specification discloses hydrogen sulfide on page 3, line 15. Appropriate correction is required.

Claim Objections

Claim 1 is objected to because of the following informalities: "sulfite" appears to be intended as "sulfide" because the specification discloses hydrogen sulfide on page 3, line 15. Appropriate correction is required.

Claim 6 is objected to because of the following informalities: "that contain sulfur dioxide and hydrogen" should be changed to -that contain sulfur dioxide or hydrogen-. Also, "and" should be inserted after the comma. Also, "wherein where" appears to be ungrammatical. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which

Art Unit: 1754

it is most nearly connected, to make and/or use the invention. Claim 1 states that gas G contains elemental sulfur and hydrogen sulfite, which is used to react with mercury. However, the specification recites only elemental sulfur and hydrogen sulfide, which is used to react with the mercury.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 1754

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 6-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of EP 0709128 A2.

WO 94/11105 teaches on pages 3-4 a process where sulfur dioxide containing gas is reacted with hydrogen over a catalyst to form sulfur and hydrogen sulfide. Page 6, lines 10-24 teach the gas flow was heated prior to catalysis. WO 94/11105 does not teach the resulting sulfide and sulfur is used to react with mercury and is precipitated.

However, EP 0709128A2 teaches that sulfur and sulfide compounds react with mercury to form mercuric sulfide, which is highly insoluble (see column 2, lines 25-31). The figure shows a heat exchanger before the sulfide supplying component in the form of Na_2S_4 is sprayed into mercury containing gas. The figure also teaches an absorber (7) for removing the precipitated mercuric sulfide. At the time the invention was made, it would have been obvious to use the product of one process, i.e. the S and sulfide compounds in WO '105 as a reactant in another process, i.e. the process where S and sulfide is used to precipitate mercury if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950. Furthermore, EP '128 teaches an electrostatic filter for removing dust prior to the injection of sulfide and sulfur supplying compound into the gas phase; however, it would have been obvious to one of ordinary skill in the art to place the filter for removing the dust prior to the catalyzer in the combination of the two processes since removal of dust prior to passing the gas over the catalyst would lengthen the catalyst life.

Art Unit: 1754

Claim 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of EP 0709128 A2 as applied to claims 1, 2, 6-10, and 12 above, and further in view of Suggitt '489.

The rejection of claims 1, 2, 6-10, and 12 as being unpatentable over WO 94/11105 in view of EP 0709128 A2 is applied herein.

Neither reference teaches synthesis gas as a supply of hydrogen or sulfur containing gas.

However, Suggitt '489 teaches that synthesis gas contains hydrogen sulfide, COS, and hydrogen. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use synthesis gas to supply the hydrogen and sulfur containing compounds needed in the process of WO 94/11105 in view of EP 0709128 A2 because Suggitt '489 teaches synthesis gas contains these components, and it would have been obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of EP 0709128 A2 as applied to claims 1, 2, 6-10, and 12 above, and further in view of Hedenas '231.

The rejection of claims 1, 2, 6-10, and 12 as being unpatentable over WO 94/11105 in view of EP 0709128 A2 is applied herein.

Neither reference teaches sulfur dioxide is obtained from the roasting of pyrite.

Art Unit: 1754

However, column 1, lines 25-38 of Hedenas '231 teach that sulfur dioxide is obtained from roasting pyrite. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use the sulfur dioxide from the roasting of pyrite in the process of WO 94/11105 in view of EP 0709128 A2 because it would have been obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of EP 0709128 A2 as applied to claims 1, 2, 6-10, and 12 above, and further in view of Proctor '915.

The rejection of claims 1, 2, 6-10, and 12 as being unpatentable over WO 94/11105 in view of EP 0709128 A2 is applied herein.

Neither reference teaches the flue gas is used in a preheater to heat the incoming air of a power plant.

However, Proctor '915 teaches that flue gas is used in a preheater to heat the incoming air of a power plant (see column 6, lines 42-45). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to first use the flue gas to heat the incoming air of a power plant before the process of WO 94/11105 in view of EP 0709128 A2 because column 6, lines 42-57 teach this is a method for recovering heat, which contributes to the efficiency of the process.

Art Unit: 1754

Claims 1, 2, 6-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of Rosenthal '304.

WO 94/11105 teaches on pages 3-4 a process where sulfur dioxide containing gas is reacted with hydrogen over a catalyst to form sulfur and hydrogen sulfide. Page 6, lines 10-24 teach the gas flow was heated prior to catalysis. WO 94/11105 does not teach the resulting sulfide and sulfur is used to react with mercury and is precipitated.

However, Rosenthal '304 teaches that sulfur and sulfide compounds react with mercury to form mercuric sulfide, which is highly insoluble (see column 2, line 4 and claim 1). Column 2, line 67 to column 3, line 2 teaches that a heat exchanger is used prior to mixing the mercury contaminated flue gas with a sulfide supplying compound. Column 3, line 53 teaches an electrostatic filter for removing precipitated mercuric sulfide. At the time the invention was made, it would have been obvious to use the product of one process, i.e. the S and sulfide compounds in WO '105 as a reactant in another process, i.e. the process where S and sulfide is used to precipitate mercury if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950. Furthermore, Rosenthal '304 teaches an electrostatic filter for removing dust prior to the injection of sulfide and sulfur supplying compound into the gas phase; however, it would have been obvious to one of ordinary skill in the art to place the filter for removing the dust prior to the catalyzer in the combination of the two processes since removal of dust prior to passing the gas over the catalyst would lengthen the catalyst life.

Art Unit: 1754

Claim 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of EP 0709128 A2 as applied to claims 1, 2, 6-10, and 12 above, and further in view of Suggitt '489.

The rejection of claims 1, 2, 6-10, and 12 as being unpatentable over WO 94/11105 in view of Rosenthal '304 is applied herein.

Neither reference teaches synthesis gas as a supply of hydrogen or sulfur containing gas.

However, Suggitt '489 teaches that synthesis gas contains hydrogen sulfide, COS, and hydrogen. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use synthesis gas to supply the hydrogen and sulfur containing compounds needed in the process of WO 94/11105 in view of Rosenthal '304 because Suggitt '489 teaches synthesis gas contains these components, and it would have been obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of Rosenthal '304 as applied to claims 1, 2, 6-10, and 12 above, and further in view of Hedenas '231.

The rejection of claims 1, 2, 6-10, and 12 as being unpatentable over WO 94/11105 in view of Rosenthal '304 is applied herein.

Neither reference teaches sulfur dioxide is obtained from the roasting of pyrite.

However, column 1, lines 25-38 of Hedenas '231 teach that sulfur dioxide is obtained from roasting pyrite. At the time the invention was made, it would have been obvious to one of

Art Unit: 1754

ordinary skill in the art to use the sulfur dioxide from the roasting of pyrite in the process of WO 94/11105 in view of Rosenthal '304 because it would have been obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/11105 in view of Rosenthal '304 as applied to claims 1, 2, 6-10, and 12 above, and further in view of Proctor '915.

The rejection of claims 1, 2, 6-10, and 12 as being unpatentable over WO 94/11105 in view of Rosenthal '304 is applied herein.

Neither reference teaches the flue gas is used in a preheater to heat the incoming air of a power plant.

However, Proctor '915 teaches that flue gas is used in a preheater to heat the incoming air of a power plant (see column 6, lines 42-45). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to first use the flue gas to heat the incoming air of a power plant before the process of WO 94/11105 in view of Rosenthal '304 because column 6, lines 42-57 teach this is a method for recovering heat, which contributes to the efficiency of the process.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Any inquiry concerning this communication or earlier communications from the

Art Unit: 1754

examiner should be directed to Anthony J Kuhar whose telephone number is 703-305-7095. The examiner can normally be reached on 8:45 am - 5:15 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stan Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

AK

AK
June 20, 2003

SJB

STEVEN BOS
PRIMARY EXAMINER
GROUP 1100